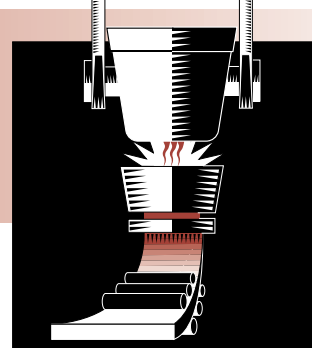


# STEEL

## Project Fact Sheet



## DEVELOPMENT OF THE AUTOMATED STEEL CLEANLINESS ANALYSIS TOOL (ASCAT)

### BENEFITS

- Successful industry-wide implementation of ASCAT technology will reduce waste in processing and save the steel industry at least \$40 million annually
- Production of high value added, higher quality steel for critical applications
- Energy efficiency will be improved through minimization of steel rejections. Energy savings estimated: at least 3.2 billion MJ per year or about 0.25% of the steel industry energy consumption
- Improved customer satisfaction

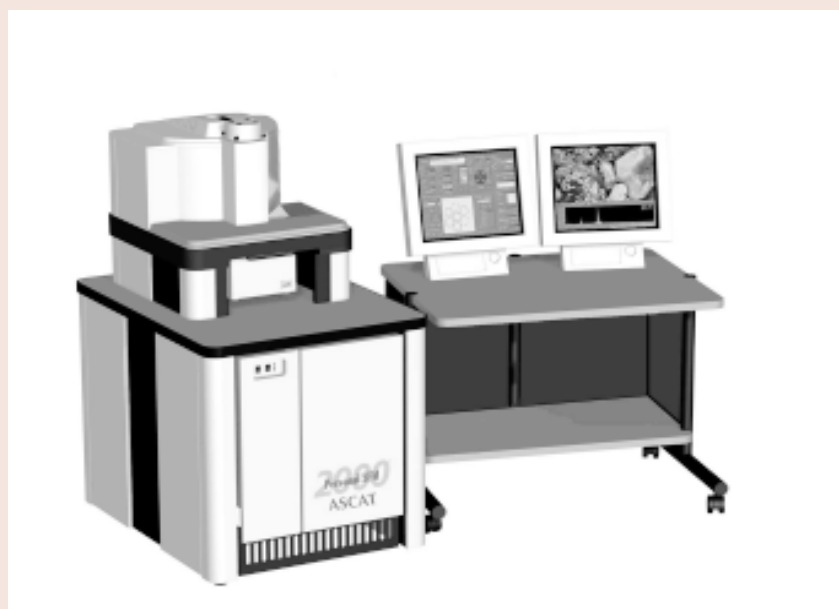
### APPLICATIONS

The technology has the potential for application to the production of about five million tons of steel per year used for critical applications. Eventually the technology could be used in expanded applications if the results are compelling.

### RESEARCH RELATED TO THE DEVELOPMENT OF ASCAT WILL IMPROVE THE PERFORMANCE OF STEEL MILLS TO PROVIDE HIGHER QUALITY STEEL

The U.S. Department of Energy is collaborating with the RJ Lee Group to conduct research to develop, build, evaluate, demonstrate, and integrate the use of ASCAT in up to two steel mills. The ultimate goal of the four year project is to develop technology that will allow steel producers to evaluate the quality of steel during production. The development and use of ASCAT will allow critical assessments and adjustments to be made within the production cycle. At the end of the four year development, it is anticipated that a fully functional ASCAT will be operational in steel mills. The overall effort led by RJ Lee Group involves Oak Ridge National Laboratory, RJ Fruehan Consulting, and RJ Lee Instruments, Ltd. Steel cleanliness will be monitored through analysis of individual inclusions using computer controlled scanning electron microscopy (CCSEM) techniques. This rapid and quantitative technique will be the foundation of the ASCAT.

### ASCAT 2000



The ASCAT will be based on the RJ Lee Instruments' Personal SEM 2000 technology.



## Project Description

**Goal:** To research inclusion characterization, develop an ASCAT that will allow steel producers to evaluate steel quality during production, and demonstrate the unit in up to two steel mills.

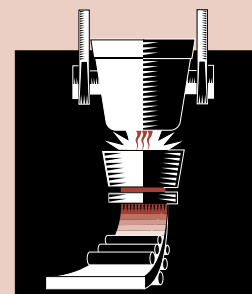
The project will have five major areas of investigation: 1) development of rapid, near real time, analysis tool capable of locating, sizing, and identifying critical defects; 2) development of a methodology for the extraction and preparation of samples from liquid steel for analysis of their inclusion distributions; 3) testing of a rugged ASCAT system to gather data in steel mills; 4) data analysis to develop and quantify benefits and determine performance characteristics for ASCAT; and 5) introduce ASCAT as part of the steel production process in the steel mill environment.

## Progress and Milestones

A literature search on recent inclusion analysis research has been completed. Inclusion characterization work is underway on samples received from steel company participants. Preliminary evaluation of these samples has been completed. Investigation of rapid sample preparation techniques is nearing completion.

The following major milestones are expected to be attained during the four year project:

- Project start date, September 1999.
- Successful demonstration of the ability to conduct reliable automated measurements of critical inclusion parameters within the process turn-around time in a laboratory environment.
- Successful demonstration of the ability to obtain and prepare samples and to conduct reliable automated measurements of critical inclusion parameters in a plant environment within the required process turn-around time for a sustained period of time. Presentation of a technical paper at the annual Iron and Steel Society conference.
- Successful demonstration of predicting down-stream failures based on measurement of inclusion size, number and/or distribution for critical target steel cleanliness applications.
- Successful introduction of ASCAT as part of the steel production process in up to two steel mills. Presentation of a technical paper at the annual Iron and Steel Society conference.
- Successful validation of process improvement driven by in-plant use of ASCAT in up to two steel mills. Presentation of a technical paper at the annual Iron and Steel Society conference.
- Project completion date, September 2003.



## PROJECT PARTNERS

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February 2001